monograph, is a native of Caucasia, and is said to have been introduced into Europe from the banks of the River Phasis (now the Rion) in Colchis (now Kurtais). Though not mentioned by Mr. Beebe, the remains of Phasianus have been found in the Miocene of France and Switzerland, in the Pliocene of Greece, and in the Pleistocene of Germany—hence pheasants, possibly forms of colchicus, existed in Europe long before the advent of man.

With regard to the Koklass pheasants—genus Puchrasia—Mr. Beebe alludes to the difficulty of placing them with certainty in any linear scheme of classification. They show traces of resemblance to several groups, and perhaps come as close to the genus Syrmaticus, as defined by him, as to any other. The genus is one of the most interesting of the Phasianinæ, and its various forms reveal one of the rarest phenomena in nature—a widespread series showing delicately graduated and increasing complexity within a single closely related group of living creatures. Three species are recognised—*P. macrolopha*, *P. xanthospila*, and *P. darwini*, each with several forms.

The genus Syrmaticus, previous to Mr. Beebe's researches, contained a single species only—the gorgeous long-tailed Reeves pheasant, but here it has been expanded to include four additional species, namely, the copper pheasant, *S. soemmerringi*, comprising three forms; Hume's pheasants, *S. humiæ*, with two forms; Elliot's pheasant, *S. ellioti*; and the Mikado pheasant, *S. mikado*.

The Cheer pheasant (*C. wallichii*) exhibits a number of characters sufficiently distinct to warrant its inclusion in a separate genus, *Catreus*. It is confined to a comparatively small belt in the west and central Himalayas—Kumaon, Garhwal, and western Nepal—where it is found at elevations of 4000-10,000 feet.

In addition to the author's masterly treatment of the taxonomic aspect of the subject, he has added a charm to it by his graphic descriptions of the haunts and habits of the various birds which came under notice during his remarkable journeys, undertaken for observing and procuring specimens in various stages of plumage. He has also quoted copiously, when desirable, from the experiences of others. This combination of excellence, if it has ever been equalled, has never been surpassed in such a monograph.

The coloured plates, twenty-four in number, are reproductions from original drawings. Of these eleven are devoted to the principal forms of the true pheasants, and are from very careful drawings by the late Major Jones. The rest are the work of several well-known artists, among them Mr. G. E. Lodge, Mr. Fuertes, and Mr. Grönvold, but their reproduction is not so satisfactory as those which graced the preceding volumes. There are twenty-one photogravure plates depicting the haunts amid which the various forms are found and some of their nests. These are mainly from photographs by Mr. Beebe, and add much to the attractiveness of the volume. The maps delineating the distribution of all the forms treated of are a very useful adjunct.

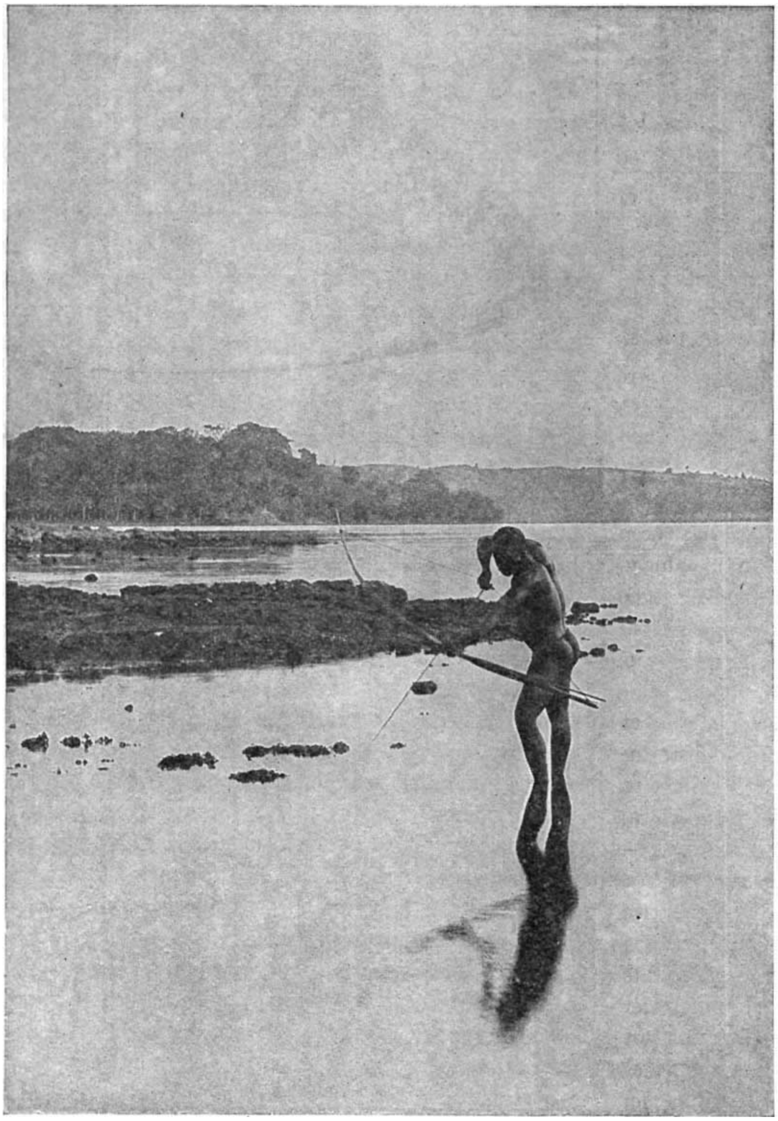
W. E. C.

A New Book on the Andamans.

The Andaman Islanders: A Study in Social Anthropology. (Anthony Wilkin Studentship Research, 1906.) By A. R. Brown. Pp. xiv+504+20 plates +2 maps. (Cambridge: At the University Press, 1922.) 40*s.* net.

THIS handsome volume contains the anthropological results of a short residence of about eighteen months in the Andaman Islands on behalf of the "Anthony Wilkin Students' Research," and may therefore be taken as a sample of approved work by the modern type of Cambridge-trained student. It is well produced by the Cambridge University Press, and is excellently illustrated from photographs taken, it is presumed, by the author. Indeed, so good are these last that the present writer recognises the originals of several of the portraits. As regards photographs illustrating these aborigines, their surroundings, habits, manners, and customs, the scientific world is specially well off, owing to the efforts extended over many years by such competent illustrators as Messrs. E. H. Man and M. V. Portman, the many magnificent volumes of the latter observer, deposited in the India Office Library, being not nearly so well known as they should be.

The book may be divided into two parts: a running account of Mr. A. R. Brown's travels, giving the results of his observations of facts, together with references to and criticisms of his predecessors in this particular field of research, chiefly of Mr. E. H. Man, and an "interpretation" of the observations. The plan of the book is thus a good one. The writer states his own observations and where he differs from his predecessors, and then builds his theories on the results. It is where he ventures to differ from Mr. Man that the plan seems to fail to be as effective as it ought to be. He constantly sets up Mr. Man's views and statements only to knock them down. He thus pits his opinions against Mr. Man's. This makes for comparison, and leads to the observation that Mr. Man was thirty years with the Andamanese, knew them intimately and their language well, and studied them unremittingly: all this, too, at a time when they were numerous, their tribes well separable from each other, and the contact with Europeans comparatively recent. Whereas Mr. Brown was with them for a short time, depended on interpreters, did not know the language except superficially, and only met them after they had been so decimated by epidemics that the tribes had had to drop their old exclusiveness and mingle freely together. It is true that Mr. Man was a pioneer who had to learn his way, and that Mr. Brown was a trained observer from the beginning, but all who know Mr. Man's work cannot also help knowing how meticulously and conscientiously careful he is in recording an observation of fact. It requires some boldness to differ from him on the point of accuracy. Several observers have tried, and not successfully. The result is that this latest book on the Andamanese after all contains only evidence and not judgment. Mr. Brown is, here, nothing more than a witness—a good witness certainly, trained to his work—but only a witness, and the reader will have to decide for himself between him and Mr. Man.



An Andaman Islander shooting fish in Port Blair Harbour.
From "The Andaman Islanders."

In the matter of recording language Mr. Brown has not been fortunate, though he has laboured hard. The older books and articles, from Mr. Man's works onwards, used an alphabet framed *ad hoc* by no less an authority than the late Mr. A. J. Ellis, whose skill, knowledge, and experience in such matters are still difficult to beat. The result has been that a good trustworthy system for recording these "unwritten" dialects for English readers has been in vogue for something like half a century. Mr. Brown has discarded it, and substituted the "Anthropos" Alphabet of Pater Schmidt. No one disputes the capacity of Pater Schmidt in this matter, but why in a book by an Englishman for English readers, published by an English University, go to an Austrian for the transcription of the language of the inhabitants of a British possession, when an adequate and well-known English transcription has been established for a long period, and has been used in many books? At any rate the result is not happy. Diacritical marks are used which are strange to English readers, though common enough in the Eastern European languages. The vowels are not familiar to users of English, and what are we to say of an observer who cannot detect the difference between "the *e* in error" and "*a* in Mary," and thinks they represent the same sound (p. 496). Or between the "*o* in not" and the "*o* in nought" (p. 496). Unhappily for Mr. Brown all four sounds are common in Andamanese, and he has thus put himself out of court as a recorder of languages, much more so as a critic of other people's work in this respect.

Like so many of his Oxford and Cambridge contemporaries, Mr. Brown reverts too often to a bad habit of the seventeenth-century writers on travel and foreign countries in ignoring the bibliography of his subject—in this case a long one—except to appropriate without acknowledgment the information gathered, often laboriously, by even living predecessors. There are too many clear instances of this in his book.

Despite its drawbacks, however, the book supplies much good evidence on its subject, and the student will do well to make its acquaintance. With the second part one is not inclined to quarrel. It propounds a theory which cannot be gone into in a short review; but whether a theory stands criticism or not as time goes on, it is a good thing to put it forward, as the mere dissection of it promotes research and the acquisition of knowledge resulting from the research.

R. C. T.

Hydro-Electric Engineering.

Hydro-Electric Engineering. Vol. 1, *Civil and Mechanical.* Editor: Dr. A. H. Gibson. Contributors: H. D. Cook and the Editor. Pp. x+232. (London: Blackie and Son, Ltd., 1921.) 25*s.* net.

THE water resources of the world, from the point of view of available power for domestic, industrial, and agricultural uses, have received very considerable attention in recent years, and in many countries a large amount of information has been accumulated as to the amount of water-power that is available for exploitation. Not only have various sources of power, such as those of the great waterfalls, been harnessed, but in addition many schemes for impounding waters in suitable valleys and utilising them for power generation, irrigation, and for distribution to cities many miles distant have been carried into effect and at the present time many more are receiving serious consideration. In this country much has been done to impound waters for town and city purposes, but comparatively little has been attempted to develop the water-power available. Until the war came, with all its consequent economic problems, not least of which is the very serious increase in the price of coal, power could be produced by steam-engines and internal combustion engines at a price which made it practically impossible for water-power to compete, involving as it does large capital outlays per unit power produced and cost of transit over long distances. It is perhaps not surprising, therefore, that although Fairbairn and James Thompson in the British Isles were largely responsible for the very important developments which took place in water wheels and turbines in the nineteenth century, and the correct principles of design were very largely developed here and in France, yet neither of these countries have developed water-power as have, for example, Switzerland, Norway, and the United States. Students in Great Britain have not been encouraged to take a very keen interest in the subject and the literature published in this country has been somewhat scanty.

Recently, however, the Water Resources Committee, which has issued a number of reports, has investigated the power available in Great Britain, and a good deal of interest has been aroused in the possibilities of the development of hydro-electric power schemes. An equal interest has been awakened in other parts of the empire where the power available is much greater than here and where coal is not so easily obtained. This work on hydro-electric engineering comes, therefore, at an opportune time, for it is desirable that engineers and business men should understand clearly the principles underlying the storage and use of water for power purposes, and engineering students should have available a trustworthy guide in the study of the subject. A word of warning is required to those who hope to take a short cut to knowledge of the subject. In few branches of engineering have such diverse matters to be dealt with, and thus only those who are prepared by a sound training in engineering principles, civil, mechanical, and electrical, can appreciate fully and overcome the difficulties.

In the work before us, the authors have discussed some of the important principles involved but a great part of the work is occupied with descriptions and details of actual works. The all-important subject of the relationship of the water available to the rainfall on a given watershed, the power that can be obtained, and the problem of the flow of water and its measurement receive adequate treatment in the first third of the book.

The remaining portion of the book deals entirely with turbines. The various types are described with the aid of drawings of actual turbines, and the principles of design are discussed. It is of the greatest importance that the behaviour of turbines under variable conditions of gate opening and speed should be known, and typical characteristic curves are given for reaction turbines in which unit power is plotted against unit speed for various gate openings. Efficiency curves are also shown for turbines working under varying conditions of load. The Pelton Wheel is described and the theory discussed. The all-important question of the choice of the most suitable type of turbine for particular conditions is somewhat briefly referred to but the essential points to be considered are clearly presented.

An important chapter is devoted to speed regulation, and hydraulic problems connected with any attempt to change suddenly the flow of a large volume of water, and the theory of the surge tank are clearly discussed. Johnson's approximate formula for the movement of the water in a large tank for a given change of velocity